

GREEN MATTERS

A newsletter from the Alberta Environmentally Sustainable Agriculture Council

From AESA Council's Chair

*by John Kolk,
Poultry Industry Council*

Tracking our Progress

One of the challenges in the work that the Alberta Environmentally Sustainable Agriculture (AESA) Program and other extension agencies do with farmers and ranchers is answering the question, "Are the private and public dollars and efforts having a positive impact on our landscapes?" Or, as an AESA Council member once asked after a presentation on all of the technology transfer efforts — "So what?"

That question is an essential part of any effort that aims to bring about change. One model of extension programming uses the acronym "KASA." It stands for: Knowledge—What do I know?, Attitude—How do I feel?, Skills—What can I do?, and Aspirations—What would I like to do?

The first concept, Knowledge, starts with measuring, benchmarking and monitoring what has happened and what is happening on our landscapes. This issue of Green Matters looks at a range of monitoring activities, from AESA's province-wide soil and water quality monitoring program, to using GPS collars for tracking cattle grazing patterns in the Bob Creek Wildland, to simply counting the number of nests that spawning trout have created along a stream.

The information collected can and does help farmers, ranchers, watershed groups, conservation agencies and governments make better decisions about actions and efforts on the landscape.

These monitoring activities allow farmers and ranchers to assess where they have been and where they are, and to predict where they might



Sarah Depoe/AAFRD

Water quality sampling

be heading. The collected data can show if their efforts are having an impact and which specific practices are having the most benefit. But these monitoring activities are only support tools for the most basic monitoring of all: farmers' and ranchers' personal knowledge of their own land.

At the recent AESA Conference on The Value of Biodiversity in Agriculture, the Calgary Zoo's Brian Keating answered a question about what should we do to conserve biodiversity. He said, "Think locally and act locally." Keating has travelled the world, and everywhere he has encountered the same deep understanding that farmers have about how to sustain their local environment.

At the same conference, Don Ruzicka, a producer from Killam, quoted a Utah rancher: "We have to get more intimate with our land." Knowing our own land and observing how it changes, whether with GPS collars or a slow, long walk through our fields, is the first step to keeping our farms healthy and sustainable.

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AESA's Monitoring Program: Unique, Relevant

AESA's Resource Monitoring Program, initiated in 1997, tracks water and soil quality in Alberta's agricultural areas. Both components provide the agricultural industry, researchers, extension agents and others with invaluable information on our soil and water resources. The collected data can help producers and producer groups to assess the effects of changing agricultural practices on the environment, and help extension agencies to evaluate the effectiveness of efforts to bring about practice change.

Soil quality

The AESA Soil Quality Monitoring Program's 42 monitoring sites are located across Alberta. Each site is typical of the soils, landscape, climate and agricultural practices in the area. The monitoring team annually measures a wide range of soil characteristics, such as nutrients, bulk density and organic matter content, as well as crop yield and biomass.

Program Coordinator Karen Cannon says, "We are the only province in Canada to have a soil quality benchmark program." Worldwide, it is one of the few long-term programs for monitoring soil quality. And it is one of the few that take measurements on a landscape basis; each site has monitoring locations at the upper, middle and lower slope positions.

The program's detailed, long-term dataset makes it invaluable for modelling. Cannon explains, "We can't possibly measure soil quality for all the different types of agricultural practices across the province. So we use models, like wind erosion, water erosion, or crop growth models, to predict soil quality changes. The monitoring sites provide the data needed for validation of modelling, so we can see what is really going on and compare that with what the models are telling us."

The unique dataset is also attracting many research partners to work with the AESA group on a wide range of environmental studies. Cannon adds, "Monitoring is only

about 20% of the work we do. We're involved in many soil quality projects related to science development, risk assessment and extension."

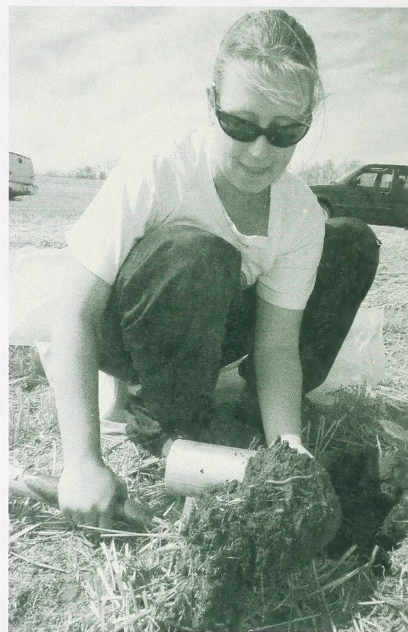
One of the program's extension efforts could help farmers to monitor their own soil quality. She says, "We are currently evaluating various qualitative and quantitative options for farmers so they can identify potential problems and monitor the effects of their management changes."

Water quality

AESA Stream Survey is the only program in Canada for long-term monitoring of water quality in small streams in agricultural areas. The program monitors water quality in 23 streams in agricultural areas across Alberta. The streams are in watersheds that are representative of various types of natural and agricultural characteristics common to Alberta. Samples are collected at each monitoring site during both high and low flows every year, to ensure representative data. The samples are tested for phosphorus and nitrogen, fecal bacteria, and about 40 pesticides.

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Water quality tends to be very variable; data must be collected over a long period to determine trends. "However, information is emerging in terms of what water quality issues are specific to certain parts of the province, certain times of the year, things like that," says Jamie Wuite, a Water Quality Specialist with Alberta Agriculture, Food and Rural Development who leads the program.



Sampling at a soil quality monitoring site

Such information is useful for targeting extension programs. Wuite explains, "For instance, with very few exceptions, your BMP [beneficial management practices] dollar is best spent on reducing the impacts of practices related to snowmelt or spring runoff because, in much of Alberta, most of the runoff happens before June. That has implications for things like selection of cow-calf wintering sites."

AESA Stream Survey has developed an index to help communicate water quality results. Says Wuite, "The index distills the large amount of technical information that we prepare every year into something more easily digested, and more useful to, producers, watershed groups and extension agents." Wuite and his group have also developed a water quality monitoring manual for use by community watershed groups.

Both programs depend on strong partnerships with many agencies and individuals for their success. For more information on AESA's Resource Monitoring Program, visit aesac.ca.

Tracking Wolves in Southwest Alberta: Better for Ranchers, Better for Wolves

In the picturesque Pincher Creek area, where mountains surge up from prairie without a foothill in sight, wolf habitat overlaps prime cattle country. Now wildlife managers, in cooperation with local stakeholders, are using improved tracking technology that could help maintain wolf populations while minimizing the depredation of cattle.

Dr. Carita Bergman, an Area Wildlife Biologist with Alberta Sustainable Resource Development (SRD), says research in other regions shows that many wolves do not kill cattle. An accurate tracking system would allow her to identify which packs may be responsible for depredation so that prevention and control measures can be targeted to those specific packs. Limiting the loss of those wolves that are not causing problems is essential to allow wolves to fulfill their vital role in the natural ecosystem.

Placing a collar with tracking device on a captured wolf and then releasing the wolf back into the wild is not new. "In the past, we've used VHF – 'very high frequency' – transmitters to track animals that we release," explains Bergman. "Those transmitters send out a beeping signal that we can pick up with a receiver." However the transmitter's weak signal often makes it difficult to find the collared animals from the ground. That has prompted SRD to try Argos satellite collars.

Bergman says the Argos collars are different from the more common GPS (global positioning system) collars. A GPS collar receives signals from several satellites, uses that information to determine the collar's location and stores that

information in the collar. The problem with using a GPS collar to track a wild animal is that you need to find the animal with its collar to retrieve the location data. If you can't find the animal, or if the collar is lost, or if the GPS unit malfunctions, you don't have any data.

The Argos collar avoids these pitfalls. It works by transmitting a signal to a single satellite. The signal's pitch, as heard by the satellite, changes as it passes overhead, just like the sound of an ambulance changes as it approaches and then moves away. The satellite uses the changing pitch to calculate the wolf's location and then it sends the data to earth. Bergman receives the location on her computer within an hour of the collar transmitting a signal.

"The collars will help provide information that we desperately need to begin moving in a positive direction, rather than living in fear of wolves killing cattle."

That means she doesn't need to spend money and time conducting aerial searches for the animal just so she can extract the data from the collar. As well, if the collar is eventually damaged or lost, she will still have the data until that point. And best of all, with real-time data, she can inform ranchers about current pack locations and identify which packs might attack cattle. This opens the door to more selective and effective prevention and control measures.

Bergman receives suggestions on how to reduce wolf-human conflict from a multi-stakeholder committee called the Oldman Basin Carnivore Advisory Group. It has representatives from the Alberta Beef Producers,



Argos collar

Federation of Alberta Naturalists, Alberta Trappers Association, the M.D. of Ranchlands, the Defenders of Wildlife Canada, and producers from the local ranching community.

"The stakeholder committee supports using this technology to gain knowledge of wolf movements, to increase prevention and control options, and to avoid removing entire packs," she says. "Where we do have significant problems, we try to reduce the pack in a selective fashion so that we can maintain some wolves in the landscape, rather than perhaps losing them all."

Better information on wolf movements can help ranchers prevent cattle depredation. "Proactive measures include moving cattle to a different pasture, running cow-calf pairs instead of yearlings in high-risk pastures, or changing the timing of when specific pastures are used," notes Bergman. "Or if you have a pasture that you're worried about, you could check it more often. The increased human presence may deter wolves from starting to kill cattle."

Along with the stakeholder committee, local trappers are also key partners in the management effort, using their expertise to conduct live captures so wolves can be collared. SRD, Alberta Community Development, and the Defenders of Wildlife Canada provide funding.

Says Bergman, "The collars will help provide information that we desperately need to begin moving in a positive direction, rather than living in fear of wolves killing cattle."



A wolf being collared for tracking

Grazing Patterns & Landscape Health

A study slated to begin this spring will be using global positioning system (GPS) collars to track cattle on pastures in and around the Bob Creek Wildland in southwest Alberta. Local ranchers and range managers are hoping that monitoring of grazing patterns will provide a fast, effective way to assess which grazing management practices are best for landscape health.

The Bob Creek Wildland is one of the two protected areas in the Whaleback region, which is famous for its haunting beauty and its ecological and cultural significance. Recognizing that these heritage values extend well beyond the protected area, several local ranchers have formed the Bob Creek Wildland Watershed Group to maintain and enhance watershed health on their leased and deeded lands in this remarkable area.

"We hope to see which projects and activities are eliciting the best and biggest responses in grazing behaviour."

The group is made up of eight ranchers who have grazing rights in the Bob Creek and Spring Creek watersheds. They began by having the Cows and Fish program assess the health of their riparian areas, the lands along

the edges of streams and lakes. When riparian areas are healthy, they perform such functions as filtering out contaminants for better water quality, providing flood protection, and providing habitat.

The ranchers are now developing various grazing management projects to enhance both riparian functioning and the health of the upland grazing lands in the watershed. "And that's where we came in with the idea of using GPS collars," says Mike Alexander, a Range Management Forester with Alberta Sustainable Resource Development (SRD). "It's a great opportunity to collect baseline information and monitor how changes in grazing management practices influence grazing behaviour on this landscape. We hope to see which projects and activities are eliciting the best and biggest responses in grazing behaviour."

Alexander explains, "In the past, the only way to tell if a management change worked was to monitor the vegetation. It can take quite a while before changes in grazing patterns result in significant changes in vegetation patterns. With the GPS collars, we hope to be able to see early on and up front, how the grazing patterns change, which management changes elicit the fastest and quickest response by the animals, and which management changes provide the best results in terms of the vegetation changes we want to occur.

"For upland range health, desired responses include an increase in litter [plant residues, which protect the soil from erosion] if litter is lacking, and a diverse, healthy plant pasture community with tall grasses, mid- and low-growing grasses and forbs in the stand, so you have a multi-layered structure to the grassland. And for riparian health, we're looking at reducing human-caused bare soil, re-introducing shrubs to some areas where they likely occurred historically, and having good, strong banks."

A GPS collar uses signals from satellites to continuously determine the collar's location, and it stores the data in the collar. Because the collars cost more than \$5000 each, only about 10 animals will be collared at a time for this project.

They plan to evaluate the effects on grazing patterns of such options as off-stream water developments, placement of salt or other attractants, changes in fencing, and changes in the season of grazing. They may also look at grazing patterns within individual pastures because some evidence suggests cattle prefer different forage species at different times of year.

Alexander is particularly interested in evaluating dormant season grazing of the rough fescue. "The traditional approach in this area would probably be to graze from late June-early July to mid-October. We would like to look at what options may exist to graze during the dormant season because that's how these lands were used under a natural system. Before Europeans, bison tended to graze on the mixed grass prairie during the summer and move into the foothill fescue and montane areas in the winter." The foothills offer several advantages for winter pasture: they are frequently snow-free because of the chinook winds, they have trees for shelter, and the rough fescue is very nutritious at that time of year.

The project's results could also help other ranchers and range managers in selecting grazing management practices. Alexander says, "Many of the results could be applied to other areas, particularly some of the more dynamic and diverse grazing systems along the foothills, with forest, grasslands, and shrublands all together."



Bob Creek Wildland

Stan Bell

"Sitting as a County Councillor and going to a lot of meetings, you hear about [environmental issues]," explains Stan Bell. "Then you start thinking, I have to be a little bit more careful with the way I take care of my environment because, even though my impact may be minimal, if I multiply my impact times the impacts from all my neighbours, it becomes significant."

Along with being a Councillor for Red Deer County, Bell is also a member of its agricultural service board. He says, "To me, there is no place that you can learn as much, be exposed to as many people, as being a municipal councillor."

"There's a big gap between the vision and the reality, but that's what we're there to fill."

And one of the things he's learned is the importance of looking into the future. He says, "When I first came on as County Councillor six years ago, I thought, 'What do we need all these plans for? What do we need to do all this what-if stuff for?' As you become part of the process, you realize that it's so important. ... To take [many of these plans] to fruition sometimes is a 20-year process. So I think it's really, really important that we start looking that far ahead."

photo: Roger Bryan/AARFD



That visionary perspective fits well with his new role as a member of AESA Council. Bell says, "The key thing that's struck me is that [AESA Council] has been set up to ... look at this environment we live in and ask, 'If we continue in this direction, what's it going to look like in 10 or 20 years? What are the kind of

things we can start to set in place now that will bring about a positive impact in 10 to 20 years, so we can end up where we really want to be?'"

On AESA Council, he represents the Central Region Committee, which reviews applications from local agencies for funding under AESA's Farm Based extension program. As well, the Committee is also "the check and balance to make sure that things are going well, and to see where we can make improvements in the program," explains Bell.

One challenge he sees for the Committee is taking AESA Council's vision for environmental stewardship to the level of individual producers. He says, "There's a big gap between the vision and the reality, but that's what we're there to fill."

David Hill

As the Alberta Irrigation Projects Association's new representative on AESA Council, David Hill hopes to "share the positive experiences we've had in seeing the benefits that come from doing the best job you can with water," and "to make sure we're aware of other environmental issues that may have a place in our community."



photo: Roger Bryan/AARFD

With over 30 years of experience in Alberta's irrigation community, Hill brings expertise in such areas as water management, sustainable development, research, and policy review to Council. He has worked for Alberta Agriculture, the Bow River Irrigation District and the Eastern Irrigation District.

Hill became Executive Director of the Alberta Irrigation Projects Association (AIPA) in May 2003. "Overall, the association exists to promote the values and benefits associated with irrigated agriculture and water management to producers, communities and regions," he says. "It covers a wide range of activities associated with how water is managed in southern Alberta."

AIPA's primary members are Alberta's 13 irrigation districts; it also has associate members from agencies with an interest in irrigation. The water carried in each district's water system is used for many purposes in addition to irrigation, such as wildlife habitat, recreation, power and water supplies for communities, companies and individuals.

"... it's time for agriculture to take a leadership position in dealing with resource issues..."

The irrigation districts "have been working at a very quick pace for the last 10 years to improve how water is managed on farms, and to improve how we use it and manage it within our canal systems," notes Hill. These improvements have reduced the amount of water per acre used for irrigation by about 30%.

"The association has a very strong understanding of the need to help producers move to more environmentally sustainable production," explains Hill. "Our districts have been doing that for a long time in how they manage water and run their systems. We've also been very successful within the irrigation community and partnering with conservation associations such as Ducks Unlimited, Pheasants Forever and the Partners in Habitat Development program. And all the districts are involved in water quality testing, and support and work with basin groups on water quality initiatives."

Hill says, "We have the sense that it's time for agriculture to take a leadership position in dealing with resource issues because we really do have the experience. The big challenge in doing that is finding the ways to communicate to growers, to decision-makers in provincial, federal and local governments, and within government departments."

Fish Tales



In the Little Red Deer River watershed, local stakeholders and the Alberta Conservation Association (ACA) are monitoring fish numbers as one indicator of watershed health. "If you have a good fish population, it often indicates that things are working well in your river or stream," says Lesley Gavelin.

Gavelin is the watershed coordinator for Friends of the Little Red Deer River Society and the assistant watershed coordinator for Mountain View County. These agencies along with PFRA/Agriculture and Agri-Food Canada, M.D. of Bighorn, M.D. of Rocky View and Red Deer County have teamed up with the ACA to conduct brown trout spawning surveys and population inventories.

"Brown trout ...require a lot of things that are synonymous with good water quality."

The ACA's Jay Wieliczko says, "Brown trout are a good indicator species because they require a lot of things that are synonymous with good water quality. For spawning, they need cool, clean water and clean gravel. If the gravel is covered or compacted with sediment, it can asphyxiate their eggs... Trout are also quite susceptible to excessive nutrients and other associated water quality problems."

Maintaining bank vegetation, especially woody vegetation, is key to good trout habitat and riparian health. Wieliczko explains, "It provides cover and shade [to keep the water cool], and it holds the bank together so excess sediment isn't released into the stream. Excessive sediment covers up the gravel ... and it absorbs energy from the sun, causing the water to warm up faster. Contaminants and nutrients can also affix to the sediment, decreasing water quality. And high nutrients and warm water can cause high algae and weed growth."

In the fall, brown trout excavate small pits in clean gravel for their nests, called redds. Then they lay their eggs in the redds and cover them with gravel. Wieliczko says, "These redds are readily recognizable once you know what to look for. You can just walk along a stream and count the redds to get a general idea of the number of adult trout trying to reproduce that year. This gives us a quick glance as to what's happening in the system."

To gather more precise population data, the ACA uses a technique called electrofishing. Wieliczko says, "It's a non-lethal sampling method in which we apply electricity to the water. It temporarily attracts and stuns any fish in the water. We are then able to capture the fish and collect biological information from them, and using a formula, we can calculate the fish population."

The ACA has been monitoring trout populations along Dogpound Creek, a tributary of the Little Red Deer, for over 15 years. It



Electrofishing to monitor brown trout populations

conducted a baseline inventory before it began conducting riparian improvements along this creek. At that time, it found less than one brown trout/km in some places. By 1997 and 1998, there were 27 trout/km in these same areas, largely due to improved stream and riparian conditions.

However, numbers have dropped sharply since 1998. Three consecutive years of drought may be contributing to this decline. Fortunately, riparian improvements can reduce drought impacts because healthy riparian areas can store more water during high water periods and release this water during low periods.

Along with the ACA projects, landowners in the watershed are involved in many other watershed projects. Gavelin says, "Our projects range from riparian area fencing, to off-site watering, to catchment basins for feedlot runoff control and winter feeding area relocations." The projects have received funding assistance from a variety of public and private agencies.

Christiane Brower/ACA

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Green Matters is the newsletter of the Alberta Environmentally Sustainable Agriculture (AESA) Council. AESA Council consists of representatives from Alberta's agriculture and food processing industry, environmental organizations and government.

AESA Council's vision is that Alberta has a thriving agriculture and food industry that is operating in an environmentally responsible manner. Its mission is to lead the agriculture and food industry in addressing environmental challenges. And its goal is to develop and deliver collaborative environmental stewardship initiatives that result in sustainable growth of Alberta's farm, ranch and agri-food processing industry.

The purpose of Green Matters is to provide a forum for discussion of environmental issues in Alberta's agriculture and food processing industry.

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